



Check Your Understanding

- Vocabulary** The product of reciprocals always equals 1.
- Error Analysis** Find and correct the error in the work at the right.

$$\frac{11}{9} \div \frac{2}{3} = \frac{3}{11} \times \frac{2}{3} = \frac{6}{11}$$
- Open-Ended** Write a fraction and its reciprocal.

Find each quotient.

4. $5 \div \frac{3}{8}$

5. $\frac{10}{16} \div \frac{5}{16}$

Homework Exercises

For more exercises, see Extra Skills and Word Problems.

GO for Help

For Exercises	See Examples
6–10	1
11–23	2–3

Write the reciprocal of each number.

6. $\frac{2}{5}$

7. $\frac{1}{7}$

8. 11

9. $\frac{5}{3}$

10. $\frac{4}{11}$

Find each quotient. You may find a model helpful.

11. $7 \div \frac{3}{5}$

12. $9 \div \frac{4}{9}$

13. $6 \div \frac{2}{5}$

14. $8 \div \frac{3}{7}$

15. $\frac{8}{9} \div \frac{1}{3}$

16. $\frac{1}{4} \div \frac{1}{4}$

17. $\frac{11}{2} \div \frac{3}{4}$

18. $\frac{1}{5} \div \frac{1}{4}$

19. $\frac{4}{9} \div \frac{2}{3}$

20. $\frac{9}{2} \div \frac{1}{2}$

21. $\frac{8}{9} \div \frac{4}{5}$

22. $\frac{3}{4} \div \frac{1}{8}$

23. A piece of iron $\frac{2}{3}$ yard long is cut into six equal pieces. How long is each piece in feet?



24. **Guided Problem Solving** A road crew has $\frac{3}{4}$ ton of stone to divide evenly among four sidewalks. How much stone does the crew use for each sidewalk?

- What amount are you dividing evenly?
- Into how many groups are you dividing the stone?

25. **Measurement** How many $\frac{1}{4}$ inches are in $\frac{1}{2}$ foot? Draw a diagram that models the problem.

26. **Writing in Math** Explain how dividing a number by 2 and dividing a number by $\frac{1}{2}$ are different. Include a diagram.

Algebra Evaluate each expression for $a = \frac{1}{2}$, $b = \frac{1}{4}$, and $c = \frac{3}{8}$.

27. $a \div b$

28. $b \div c$

29. $c \div b$

30. **Baking** A recipe for a loaf of banana bread requires $\frac{2}{3}$ cup of vegetable oil. You have 3 cups of oil. How many loaves of banana bread can you make with the oil?

Use the table for Exercises 31–32.

31. How many times as many people live in Argentina as in Peru?
32. The population of Brasilia, Brazil's capital, is about $\frac{1}{85}$ of the country's population. What fraction of the total population of South America lives in Brasilia?

South American Population

Country	Portion of South America's Population
Brazil	$\frac{1}{2}$
Colombia	$\frac{1}{9}$
Argentina	$\frac{1}{10}$
Peru	$\frac{1}{13}$

SOURCE: U.S. Census Bureau. Go to PHSchool.com for a data update.
Web Code: aqg-9041

33. **Challenge** Simplify $\left(\frac{2}{7}\right)^2 \div \left(\frac{1}{7}\right)^2$.

Test Prep and Mixed Review

Practice

Multiple Choice

34. You want to buy enough fabric to make three stuffed bears. Each bear requires a certain amount of fabric. You want to know how much the fabric will cost for the three stuffed bears.

Step P Multiply the number of yards needed for each bear by 3.

Step Q Multiply the cost of the fabric by the total number of yards you need.

Step R Identify the cost of the fabric and the amount of fabric needed for each bear.

Which list shows the steps in the correct order for finding how much the fabric for the stuffed bears will cost?

- (A) R, P, Q (B) R, Q, P (C) Q, P, R (D) Q, R, P

35. You buy 2 shirts for \$7.99 each and a pair of pants for \$19.99. How much do you spend before tax?

- (F) \$27.98 (G) \$35.97 (H) \$39.98 (J) \$55.96

Test each number for divisibility by 2, 3, 5, 9, or 10.

36. 1,250

37. 372

38. 55,600

39. 445

0 for Help

For Exercises	See Lesson
36–39	4-1



Check Your Understanding

- Estimation** Estimate $8\frac{3}{4} \div 3\frac{1}{3}$.
- Open-Ended** Write a word problem that you can solve using $2\frac{1}{2} \div 1\frac{1}{4}$. Explain what each number represents.
- Error Analysis** Who is correct, Jocelyn or Annie?

Jocelyn

$$4\frac{1}{2} \div 1\frac{1}{3} = \frac{8}{2} \div \frac{4}{3}$$

$$= \frac{12}{12} \cdot \frac{3}{4}$$

$$= 3$$

Annie

$$4\frac{1}{2} \div 1\frac{1}{3} = \frac{9}{2} \div \frac{4}{3}$$

$$= \frac{9}{2} \cdot \frac{3}{4}$$

$$= \frac{27}{8}$$

$$= 3\frac{3}{8}$$

Homework Exercises

For more exercises, see Extra Skills and Word Problems.



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For Exercises	See Examples
4–8	1
9–11	2
12–17	3

Estimate each quotient.

4. $50\frac{1}{4} \div 5\frac{3}{16}$

5. $48\frac{8}{10} \div 7\frac{3}{7}$

6. $99 \div 8\frac{2}{3}$

7. During a storm the level of a river rose $10\frac{1}{2}$ inches in $4\frac{1}{2}$ hours. Estimate how many inches per hour the level rose.

8. The average adult's height is about 8 times the length of the person's head. A man is $6\frac{1}{2}$ feet tall. About how long is his head?

Find each quotient.

9. $3\frac{1}{6} \div 2$

10. $2\frac{1}{2} \div 7$

11. $1 \div 4\frac{1}{2}$

12. $3\frac{1}{3} \div 1\frac{1}{2}$

13. $7\frac{1}{3} \div 1\frac{5}{6}$

14. $3\frac{1}{4} \div 1\frac{1}{2}$

15. $2\frac{1}{2} \div 1\frac{1}{8}$

16. $10\frac{1}{3} \div 3\frac{1}{3}$

17. $2\frac{1}{10} \div 4\frac{2}{3}$

Test Prep Tip

Drawing a model may help you solve a problem.



18. **Guided Problem Solving** Sunlight takes about $8\frac{1}{2}$ minutes to travel approximately 93 million miles from the sun to Earth. How many miles does light travel in one minute?

- What operation can you use to find the number of miles light travels in one minute?
- How can you use estimation to check your answer?

Find the number that completes each equation.

19. $2\frac{3}{5} \div 2\frac{1}{2} = \square$ 20. $2\frac{3}{5} \div \square = 1$ 21. $\square \div \frac{1}{2} = 1\frac{3}{4}$

22. **Construction** An attic ceiling 24 feet wide needs insulation. Each strip of insulation is $1\frac{1}{3}$ feet wide. Estimate the number of insulation strips that are needed.

23. **Gardening** A gardener is building a border for a flower garden with a row of red bricks. The row is $136\frac{1}{2}$ inches long. Each brick is $10\frac{1}{2}$ inches long and costs \$.35. How much will the border cost?

24. **Writing in Math** Explain how you can use mental math to find $12 \div \frac{1}{5}$.

25. **Books** A bookstore has a shelf that is $37\frac{1}{2}$ inches long. Each book is $1\frac{1}{4}$ inches thick. How many books can fit on the shelf?

26. **Challenge** Evaluate each expression for $x = 1\frac{1}{3}$.

a. $(x + x) \div \frac{1}{2}$

b. $(x + 1) \div 1\frac{1}{2}$

Test Prep and Mixed Review

Practice

Multiple Choice

27. You serve three different kinds of pizza for dinner. The shaded areas show the amount of pizza left over. How much pizza was eaten?



(A) $1\frac{3}{4}$

(B) 2

(C) $2\frac{1}{12}$

(D) $2\frac{1}{8}$

28. Mr. Perez is driving 380 miles home from vacation at an average speed of 60 miles per hour. Which method can Mr. Perez use to find how long it will take him to drive home?

(F) Add 380 and 60.

(G) Divide 380 by 60.

(H) Multiply 380 by 60.

(J) Subtract 60 from 380.

29. Find the greatest common factor of 12 and 20.

(A) 2

(B) 3

(C) 4

(D) 5

Find the prime factorization of each number.

30. 144

31. 98

32. 276

33. 5,000

GO for Help

For Exercises	See Lesson
30-33	4-3